An Oracle White Paper in Enterprise Architecture
October 2010

Achieving the Cloud Computing Vision

ORACLE®

Disclaimer

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.

Executive Overview

Cloud computing is enabling the agility required by organizations to be leaders in today's ever growing global economy. It is accelerating the time to market for new products and services while reducing the costs to design, build, deploy, and support these products and services. It has the ability to fundamentally change the way IT services are delivered and consumed.

The cloud computing storm has been brewing since the early days of computing. In the 1960's and 1970's, the expense of acquiring and running mainframe computer systems necessitated the use of pooled resources and virtualization. In the 1980's and 1990's, inexpensive commodity hardware enabled distributed computing with rich user interfaces. In the early to mid 2000's, a virtualized grid of commodity hardware emerged. Today, cloud computing is adding self service and metered usage to the virtualized grid, enabling capabilities such as dynamic workloads and automated provisioning.

The promise of cloud computing is extraordinary. Improved agility, reduced CAPEX and OPEX, faster time to market, among others, are just some of the business benefits. And to realize your vision, it takes a disciplined approach to building a proper business case and sustainable future state architecture. This paper provides a framework and process that organizations can use to achieve their cloud computing vision.

Cloud Today

Many companies are building cloud services today. The market has progressed from Infrastructure as a Service (IaaS) offerings to more complex offerings around Platform as a Service (PaaS) and Software as a Service (SaaS). Following are two examples of organizations that have solved particular business problems by utilizing PaaS.

Financial Services Cloud Success

At a large financial services firm focused on growth, the IT organization had become very good at building applications in support of the business needs. They had well defined methodologies in place for developing applications and had established procedures to bring those applications into production. After several years and with over 1,800 applications in production, they came to the realization that, although they had well defined, mature methodologies and procedures, the IT environment was getting harder to manage, was difficult to scale, and had year over year increases in operational costs to support. Their project based approach to new functionality had resulted in server sprawl, an extremely large number of applications, poor quality, challenging maintenance and production support, and a very complex IT environment.

In order to solve these problems, and to help the business achieve a competitive edge, the company chose to standardize on a single development language, build re-usable components, and better utilize hardware. They chose to do this by building a private cloud to supports Platform-as-a-Service using industry standard hardware and middleware in order to support their standard programming environment (Java).

They have been able to achieve a 35% reduction in operating costs, a 30% reduction in project costs, a 10% decrease in running costs year-over-year, and a 1 to 10 shared server consolidation ratio. In addition, they have increased their customer satisfaction scores, and doubled their capacity while reducing power consumption by 44% over 4 years through virtualization.

State Government Cloud Success

A state government, faced with mounting budged issues, established a central IT organization in order to consolidate operations and help reduce the overall cost of government. This central IT organization was faced with the need to:

- Perform a statewide data center consolidation

- Produce new streams of revenue

- Foster an effective IT organization and culture that supports a shared services model

- Provide a sustainable infrastructure and business continuity

- Leverage compliance, standards, and optimization to become an agile, secure, efficient and effective service provider

The IT organization, in meeting these challenges, was able to set up a sustainable, manageable and marketable cost recovery model with an offering that is easy to manage and adheres to stringent

security and compliance regulations. The first of several solutions was to set up a private cloud supporting Database-as-a-Service (DbaaS) for the various state agencies and local governments.

Cloud Computing Definition

While there are many definitions and nuances of Cloud Computing, we see that the National Institute of Standards (NIST) definition is gaining popularity in the US and around the world.

"Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction."

This cloud model promotes availability and is composed of:

5 ESSENTIAL CHARACTERISTICS	3 SERVICE MODELS	4 DEPLOYMENT MODELS
• On-demand self-service	• SaaS	• Public cloud
• Resource pooling	• PaaS	• Private cloud
• Rapid elasticity	• IaaS	• Community cloud
• Measured service		• Hybrid cloud
• Broad network access		

The Road to Cloud

There are many ways to implement cloud computing today. Some are more successful than others. The ones that have been successful have applied a discipline to the methods utilized in their creation. Oracle has found that by employing a framework and standard architectural development process focusing on the needs of the business has achieved the greatest success. Following are the components of that framework and development process.

The Cloud Computing Vision

Oracle has seen cloud computing provide real cost savings and agility to its customers in all cloud service models. These companies all had a vision for their business that used cloud computing as an enabler.

What is your company's vision for cloud computing? This question forms the foundation for a cloud computing strategy. Whether trying to create a private cloud to better serve internal customers or building a public cloud for an external customer base, there are several key considerations that Oracle has linked to successful cloud initiatives.

- Understand the IT service portfolios, service-level requirements and service costs before building a private cloud service.

- Develop a separate strategic plan for all services under consideration, as well as an analysis against external service offerings.

- Build a private cloud service only after developing a complete business case analysis for doing so— it's all about return on investment, in terms of cost and business value.

- Evaluate and constantly benchmark the solution against external cloud service offerings, and ensure that flexibility is designed in at the onset.

A company's business architecture plays a key role in determining how cloud should be leveraged to achieve goals and objectives. This business architecture can be broken down into two primary components, the business strategy and the structure utilized to implement that strategy.

The organizational strategy regarding the use of IT, definition on how business processes operate, and the level of business and IT alignment as well as organizational and architectural maturity all help determine how IT services, cloud services in this case, can and should be leveraged in order to achieve an organization's goals.

The business structure defines the core capabilities of the organization and what business processes support those capabilities. For private cloud implementations, the organization is the IT organization of the business. For public clouds, the IT organization truly is the business. To clarify the concept of strategy and structure components of an organization's business architecture, take for example an IT organization with the goal of reducing the amount of time required to procure, provision, and install new hardware systems. This business goal can be implemented through a consolidation and virtualization strategy. The business processes supporting this strategy would be those revolving the methods and procedures for requesting hardware services from the IT department. The structure employed to support the strategy involves the IT department's core capability of providing hardware components to business users, and the process required to provision that hardware.

In order to achieve the results business users are expecting from IT departments, and for IT departments to build the systems necessary to support the business goals and objectives, a tighter alignment between the business and IT is mandated. Enterprise architecture is the glue between the business strategy and IT's execution of that strategy. This is especially true in the case of cloud computing. IT is acting as a business when delivering cloud services to its users. It needs to establish a product portfolio to sell (cloud services), market this portfolio (to internal and/or external users), provide a financial model to charge or recoup costs for services provided, provide customer service for the services it provide, and well as performing all those other activities a 'business' normally performs.

A Simple Cost Model to Attract Customers

From a financial perspective, Oracle has found that simple chargeback models work well in many instances. As an example DbaaS components can be broken down at a high level into processors (or cores), amount of storage, and DBA support. With these components, a simple chargeback model can be derived.

```
 (# Cores / Total Cores in DbaaS Cloud) * (Total Hardware / Software /Hosting Costs)
 (GB Storage / Total DbaaS Storage Capacity) * Total Storage Costs
+ (Hours of DBA time / Total DBA Time) * Total DBA staffing costs
-----------------------------------------------------------------------------------
= Total Customer Price
```

*This model was implemented a state government that needed to achieve 100% cost recovery.

Cloud providers know that scale brings prices down and that to attract customers they need to minimize entry barriers to make it a no brainer for customer to join. They do this by selling blocks of capacity to customers with T-Shirt pricing. They allow customers to own the blocks or lease them over time to ensure profitability. They make it easy to join with a one-stop-shop offering. With this type of solution, customers do not need to build their own data centers, hire and train staff, negotiate license deals, procure and set up hardware, or provide support. Their customers can get out of the IT business and focus more on running their business.

The Current State of IT Today

The state of IT systems within organizations today is as diverse as the set of companies themselves. This diversity comes as a result of years of project based system implementation, mergers and acquisitions, ever increasing cost cutting initiatives, and a variety of other factors. Successful companies have dealt with these factors in a variety of ways. For those that have not, there are generally accepted best practices around Enterprise Architecture that can be followed to guide them in the right direction.

Project Based System Implementations

Project based system implementation is the norm for many organizations, especially those targeting growth as a primary business driver. When targeting growth (as opposed to maximizing profitability or a mix of growth and profitability), the ability to deploy strategic applications based on specific customer needs is of high importance. However, if or when growth potential is reached, these companies will move towards a model more geared towards cost optimizations and maximum profitability from their existing customer base. At this point, the companies are faced with an abundance of applications, developed and deployed for valid strategic reasons, that potentially have duplicate functionality, are costly to maintain, and can be increasingly difficult to integrate.

Typical Current State Architecture – "an abundance of technology"
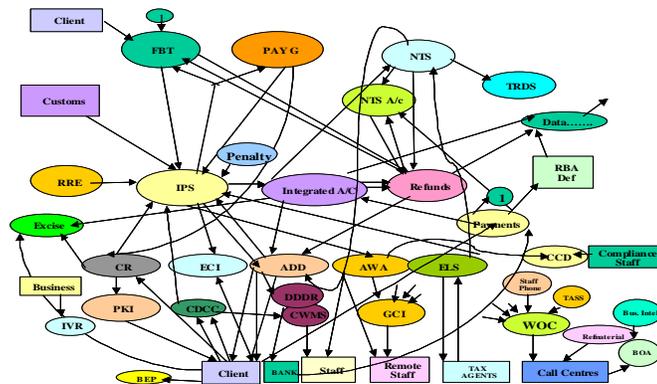
Growth through M&A

Growth through M&A is a strategy employed by many organizations today as a means to expand their customer base, increase their products lines, break into emerging markets, and a variety of other reasons. This growth usually involves the acquisition of new IT personnel, processes, applications, and technologies. These all result in duplication in many layers of IT, a high level of IT complexity, and related high IT infrastructure and support costs.

Cost Reduction Efforts

Most companies today are under tremendous pressure to reduce costs wherever possible. IT budgets are traditionally targets for cost cutting initiatives. These cost cutting initiatives often lead to failed or partially implemented systems, often intended to replace aging systems, which were poorly integrated. Further exacerbating the problem, the systems that were being replaced were never retired, leading to functionality split between numerous applications, causing complex and sometimes manual processes to be implemented and maintained across the old and new systems.

These 3 factors, along with the numerous other drivers of IT complexity have left companies in a state where 80% of IT budgets are spent just keeping the systems running, leaving only 20% being spent to support new business opportunities.

Current Organizational and Architectural Maturity

A Company's maturity can be measured in a number of ways. The organizational maturity defines the level of process maturity and process integration within a company necessary to support business goals. Architectural maturity defines the ability of a company's IT systems to support its level of organizational maturity.

In order for companies to achieve greater levels of process standardization and integration, a change in organizational structure is often necessary. For this to be successful, well defined governance processes need to be in place to help guide the required changes.

The successful deployment of clouds within organizations depends on a number of factors, some technical and some organizational. These include:

- The extent of infrastructure standardization among the existing application silos of the current state architecture.

- The complexity and degree of customization and integration of the current state architecture.

- The willingness of lines-of-business to share infrastructure instead of —owning their own.

- The extent to which the current state architecture must accommodate legacy systems .

- Past experience of the IT department in deploying technologies and concepts critical for clouds, such as standardization, consolidation, virtualization, clustering, and more

Understanding the current levels of maturity for an organization will help guide efforts in building cloud solutions, and will provide necessary inputs to the steps required for a successful implementation.

The Future State of Customers IT Environment

The corporate vision has been set. There is a good understanding of where the company is today. It is time to start thinking about what the future state of IT will look like.

The future state of the IT environment is driven from the combination of business goals and objectives, the technology solutions used to implement those goals, and the organizational changes required to support the changes necessary to move the company where it needs to be.

From an enterprise architecture perspective, future state business, application, information, and technical models will be developed to show how the business capabilities can be implemented with a cloud solution. These models will point out the gaps between where the organization is today, and where they want to be. It is these gaps that will drive the roadmap and associated initiatives in achieving the organizational. At this point, it is important to validate any future state models with company stakeholders so that there is a good understanding on what architectural direction the company is taking – and that the direction is in alignment with the business goals and objectives the organization is striving to achieve.

Let's turn our attention to the architectural components of cloud computing, IaaS, PaaS, and SaaS, that can used to accomplish business goals.
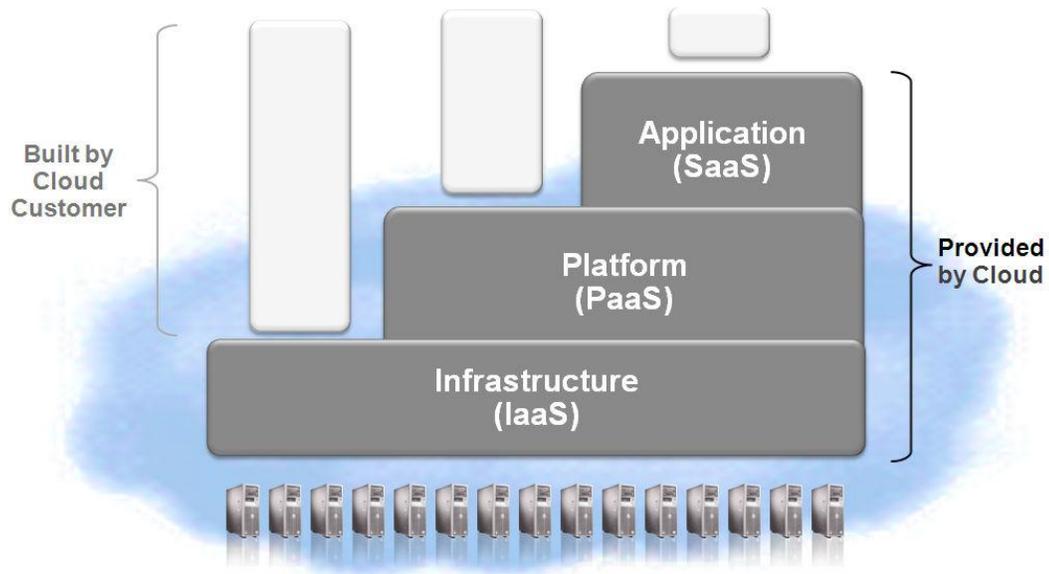

Figure: IaaS, PaaS, SaaS Conceptual Model

Infrastructure as a Service (IaaS)

One of the primary goals for companies is to reduce the amount of time and money required to procure, provision, and install new hardware systems. Companies want a faster time to market solution in order to better capitalize on market opportunities for new products and services. Infrastructure as a Service (Iaas) is one enabler that will aid in achieving this goal.

With IaaS, standards and processes are established at the corporate levels which dictate a standardized infrastructure in support of a set of given business functions. From a server perspective, this includes standardized hardware, operating system, and HW/OS configurations among others. Pre-defined storage arrays can also be defined as part of the infrastructure, as well as standard VLAN configurations to support network isolation. Further, the management of these resources should be standardized so as to provide a single logical interface for affective change and collecting information for the infrastructure as a whole.

Once the standards are in place, governance boards are established or enhanced to support the use of the standards. With the standards and processes in place, the organization is ready to offer infrastructure to support business initiatives in a rapid, cost effective manner. In the public cloud space, Amazon E2C is a prime example of this. Companies can rapidly provision infrastructure components (CPU, OS, and Network) through E2C, and storage through S3. In the Private cloud space, IT departments are able to quickly provide these types of infrastructure components to LOB's or other internal customers in a much faster, more economical way.

Rapid deployment and cost efficiencies of these infrastructure components are supported primarily through shared infrastructure and virtualization technologies. Instead of dedicated hardware for each application, virtualization enables hardware resources to be shared and pooled across multiple applications, resulting in higher efficiency and utilization and lower costs.

In addition to speed and cost, the ability to grow, shrink or move applications through cloning and live migration of virtual machines is also a feature of virtualization technologies.

Virtualization also provides the ability to package up whole applications, including their configuration, a key enabler to making applications highly mobile/portable. This makes it a lot easier to move an app from development to production, for example. It also enables the ability to clone test and production environments so you can fix or enhance the application.

Virtualization and Clustering are the two key technologies that make up Grid Computing. These technologies are complementary. Cloud Computing is NOT just server virtualization. Clustering is also an important enabler to cloud computing.

Virtualization: makes a single computer look like many computers.

- The size and power are variable/configurable.

- Virtual machines can be migrated without downtime

- Virtual machines enable far more detailed accounting of which applications, LOBs, customers are using IT resources.

Database or Middleware Clustering is also a type of virtualization. It makes many computers (or even virtual machines) look like a single resource.

- Huge databases and middleware tiers can be built using powerful, low-cost, high volume components (like blades or rack servers)

- Redundancy of clusters enables high-performance and scalability through parallel operations

- Redundancy also enables inherent high availability, as clusters can survive one or more node failures

Platform as a Service (PaaS)

Companies must be agile to compete in today's globally competitive environment. Agility involves, among other things, the ability to bring new products and services to market fast. The long lead times for IT to bring up new applications to support new and changing market opportunities are no longer acceptable. The business needs IT to rapidly develop, deploy, and maintain new applications to remain competitive.

Platform-as-a-Service builds upon the principles of IaaS by providing an environment where applications can be built and deployed in a secure, rapid, high quality manner, all on standardized infrastructure stack. By establishing a common platform to build applications, IT is enabling the agility required by the business.

Platform-as-a-Service generally refers to an application development and deployment platform delivered as a service to developers, allowing them to quickly build and deploy a SaaS application to end-users. These platforms are often built on a grid computing architecture and include either static of virtualized database and middleware layers. They are often specific to a language or API. For example Google AppEngine is Java and Python. EngineYard is Ruby on Rails. Salesforce.com's Force.com is a proprietary variation of Java.

PaaS Private Cloud – Natural for Enterprises

Because integration flexibility and control over quality of service and security are high priority for larger enterprises, and because such enterprises likely have the financial resources to optimize for costs over time rather than up-front costs, many enterprises will naturally gravitate towards the private variant in their adoption of cloud computing. An additional aspect strengthens this bias: adopting private cloud practices will be a small change for many enterprises. IT departments have in many cases already gone significantly down the path of consolidating infrastructure and setting up shared services, and enabling cloud's self service and automated dynamic capacity will often be a relatively small incremental step. This is in contrast to adoption of a public cloud offering, which will dramatically change how departmental users obtain application support.

Organizational Support for PaaS Private Cloud

In setting up a private cloud, the natural organizational structure comprises a central IT function that sets up and manages the cloud itself and various functional or product departments across the enterprise that are "customers" of the cloud.

IaaS can deliver cost savings for a private cloud initiative, and revenue for an IaaS public cloud provider. For those organizations ready to standardize not just on a hardware infrastructure, but on a middleware infrastructure as well PaaS can add additional benefits over what IaaS alone can offer. In a private cloud scenario, when the central IT function sets up an offering at the IaaS level, the departmental users would still IT expertise themselves in order to make use of the cloud, thus limiting the economic gained by centralizing the IT function. At the other end of the spectrum, an internal SaaS offering would not likely make sense in very many cases because departments wouldn't have the flexibility to create the specific functionality they require—there are very few applications that would fulfill a majority of functional needs across multiple departments. The platform level of PaaS achieves a good balance between flexibility and ease of use for the departmental cloud customers, and can be a significant driver of cost savings for the organization.

Software as a Service (SaaS)

Many companies today are adopting Software-as-a-Service as a model for implementing business functionality. Among other things, SaaS promises to lower capital expenditures, decrease IT support costs, and provide better cash flow by spreading out payments for the service over the life of the contract. Businesses also like the fact that SaaS solutions tend to have a higher user adoption rate, and have the ability to scale up and down with demand. To determine whether or not SaaS is a good fit, an organization needs to consider at least three factors (Forrester 2009).

- Key Benefits: SaaS enables fast deployment, better user adoption, reduced support needs

- Key Costs: Subscriptions balance with reduced implementation, upgrades, training

- Risk Analysis: Cost savings, adoption

The potential benefits of SaaS are well advertised. All of these benefits can and have been realized by many organizations implementing SaaS based applications. It is important however, to do a full analysis of any given SaaS solution in order to determine if it is a good fit for the specific business need of the organization. For example, an organization that currently has a CRM application with a high degree of customization and integration needs may not find a competitive SaaS based solution that can fulfill their functional requirements for the application.

When examining the cost factors of a SaaS solution, both hard and soft costs must be taken into account. Soft costs include such things as training staff on the new application, and the modification the existing business processes that may need to occur based on the functionality of the new SaaS solution. Hard costs include integration requirements for the new application into existing in-house hosted systems, and the support personnel required for the new application – although studies have shown that support costs for SaaS applications can be significantly less than in-house hosted applications.

All changes are risky to an organization. The understanding and management of the risks associated with a SaaS solution can greatly improve its overall chance of success. An example of such a risk revolves around functionality provided by a given SaaS solution. If the solution does not provide for all the functionality require by the business, the organization can build what is required on top of the SaaS solution, or go to multiple providers to get all the functionality required. While these approaches will increase the cost of the solution, the overall cost may still be lower than bringing a new application in-house in the traditional model.

Finally, in downturned economies, there are several reasons for implementing SaaS. Tight capital budgets are generally the norm today in most organizations. SaaS has the ability to greatly reduce CAPEX in an organization. Many companies today have limited available resources because of IT staff reduction activities. SaaS generally requires far fewer support resources not only for implementation, but ongoing support needs as well. Last, SaaS vendors can offer favorable payment schedules to help cash flow. Costs for the applications can be spread out over the life of the contract rather than be paid out in lump sums up front.

The Strategic Roadmap to "Cloud"

The strategic vision has been set. The current state of IT is understood in terms of how what is in place today from a process, organizational and technology perspective. The future state of IT within the business has been defined. Now is the time to plan out how the organization will need to change in order to achieve its vision for the future.

In moving to cloud based solutions organizational and process changes are inevitable. The basic model of how IT is being delivered will change. In fact, the IT organization will change to be more like a business and less like the traditional IT shop.

From an organizational perspective, the structure with the IT business will become more aligned as a business and less like a department within the business. The process to make this change requires planning and insight to be successful.

From a technology perspective, the IT infrastructure will become more standardized, less complex, and to some extent productized when viewed from the perspective of its clients. IT will sell products rather than provide services.

These organizational and technology changes cannot and should not happen overnight. Incremental steps should be planned and executed to move the organization in the direction of running IT as a business, and to alter the technology infrastructure to enable IT to sell its product portfolio.

Achieving Cloud through IT Optimization

In many cases, organizations will go through an IT Optimization process to facilitate this change. In line with the MIT Sloan Architecture Maturity model (Figure 2), organizations will progress from IT Silos where there is little technology standardization and potentially complex integrations between stand alone systems, into the Standardized Technology stage where standards are in place and companies begin to shift IT spend from local applications to a shared infrastructure model, into the Optimized IT Core stage where processes are digitized and companies move from a local view of

data and applications to a more enterprise view, and finally into the Business Modularity phase where the digitized processes put in place in the previous phase are exposed as services to IT clients.
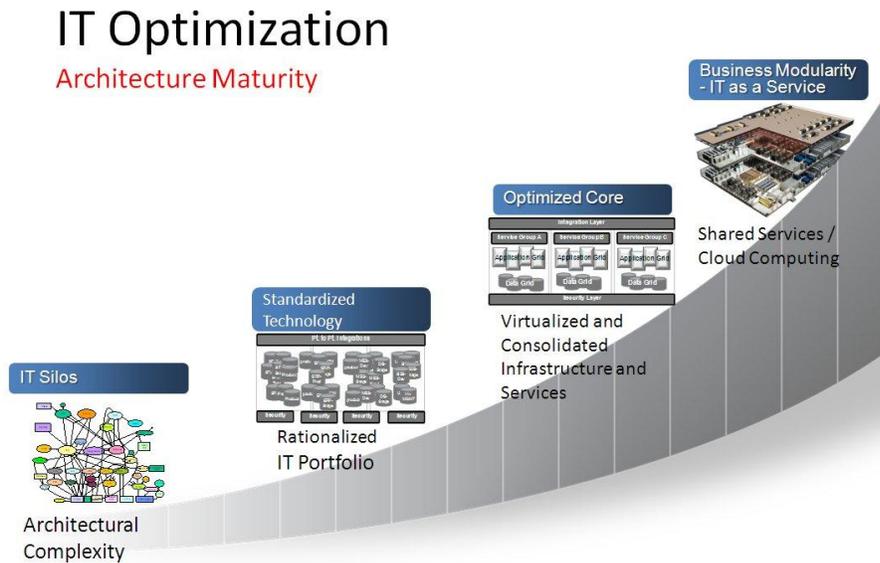

Figure 2: Architecture Maturity Model, MIT Sloan

Viewed from a cloud perspective these stages align with the IT transformation that organization will progress through on the roadmap to cloud services. As an example; database as a service starts with local applications utilizing their own database software and hardware to provide business functionality. Over time, this inevitable leads to server sprawl and increasing support costs for hardware and personnel to manage the technology and associated database software. The organization will then move towards standards for hardware and database software. This will involve a portfolio rationalization effort to migrate the applications currently running on non-standard hardware and software onto the new standard infrastructure.

Once the portfolio has been rationalized, the organization will move to further reduce the hardware footprint through virtualization techniques and begin to provide solutions for scalability and availability. In addition, processes will be put into place to easily establish new database instances utilizing the existing hardware infrastructure. Finally, once the IT Core is established, management and automation will be put into place to enable self service so that IT clients can provision databases on their own, and metered chargeback systems will be put in place so that those clients are accurately charged for the instances they provision.

Figure 3 depicts a high level generic roadmap for an organization to move from a Business Silo architecture maturity level into a shared services maturity level. It is important to note that the evolution from one state of architectural maturity to another also requires organizational change.
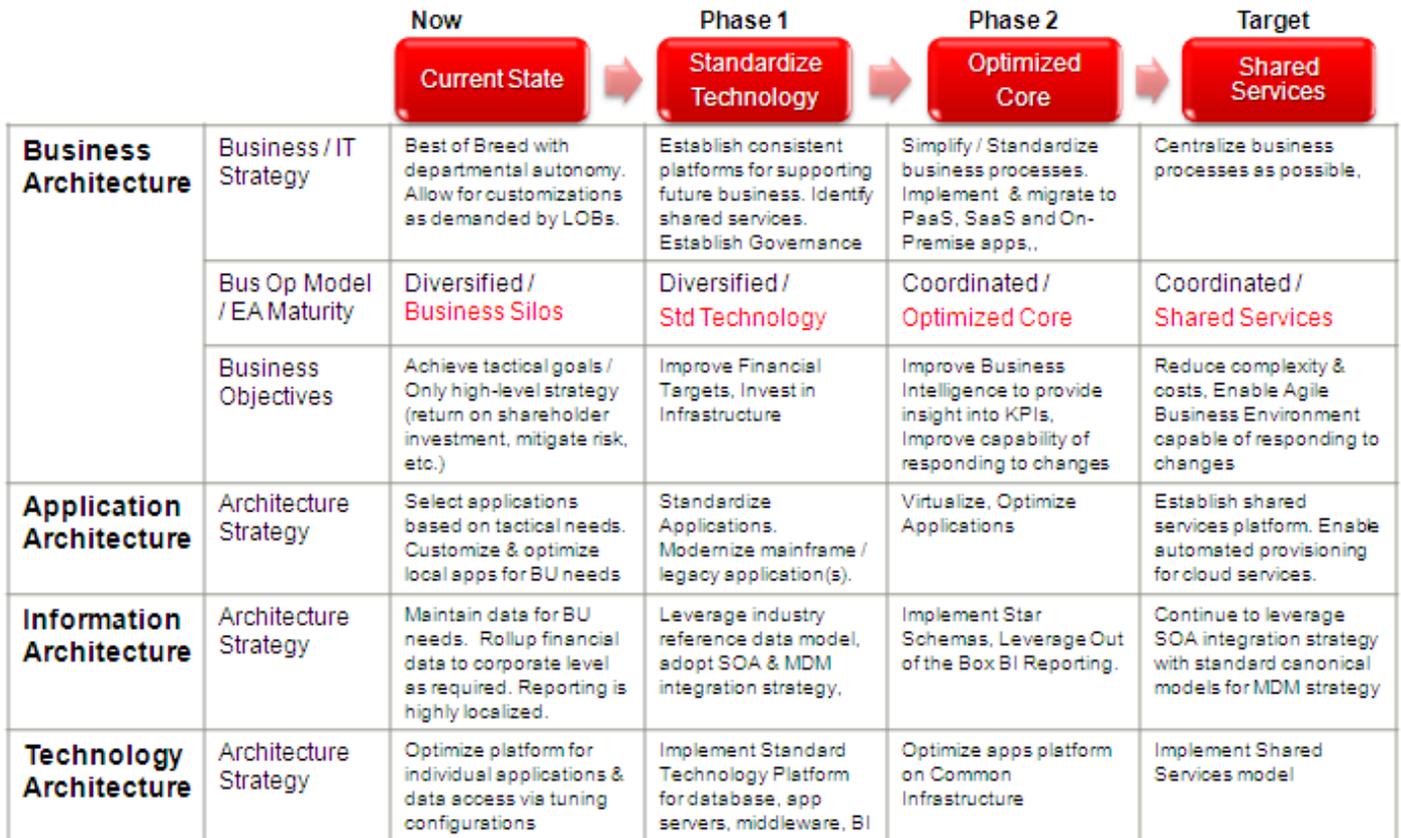
		Now Current State	Phase 1 Standardize Technology	Phase 2 Optimized Core	Target Shared Services
Business Architecture	Business / IT Strategy	Best of Breed with departmental autonomy. Allow for customizations as demanded by LOBs.	Establish consistent platforms for supporting future business. Identfy shared services. Establish Governance	Simplify / Standardize business processes. Implement & migrate to PaaS, SaaS and On-Premise apps,,	Centralize business processes as possible,
	Bus Op Model / EA Maturity	Diversified / Business Silos	Diversified / Std Technology	Coordinated / Optimized Core	Coordinated / Shared Services
	Business Objectives	Achieve tactical goals / Only high-level strategy (return on shareholder investment, mitigate risk, etc.)	Improve Financial Targets, Invest in Infrastructure	Improve Business Intelligence to provide insight into KPIs, Improve capability of responding to changes	Reduce complexity & costs, Enable Agile Business Environment capable of responding to changes
Application Architecture	Architecture Strategy	Select applications based on tactical needs. Customize & optimize local apps for BU needs	Standardize Applications. Modernize mainframe / legacy application(s).	Virtualize, Optimize Applications	Establish shared services platform. Enable automated provisioning for cloud services.
Information Architecture	Architecture Strategy	Maintain data for BU needs. Rollup financial data to corporate level as required. Reporting is highly localized.	Leverage industry reference data model, adopt SOA & MDM integration strategy,	Implement Star Schemas, Leverage Out of the Box BI Reporting.	Continue to leverage SOA integration strategy with standard canonical models for MDM strategy
Technology Architecture	Architecture Strategy	Optimize platform for individual applications & data access via tuning configurations	Implement Standard Technology Platform for database, app servers, middleware, BI	Optimize apps platform on Common Infrastructure	Implement Shared Services model

Figure 3: EA Roadmap for moving to shared services from business silos

The Impact of Governance on Cloud Computing

More than anything else, good governance is the key enabler of cloud computing. Determining what to create, who should create it, and how it should be created are all decisions that impact may areas of a company – both on the IT and business side of the house. Establishing the process by which these decisions are made is necessary for any initiative to succeed. In the case of cloud computing, strong business practices combined with an effective Portfolio Management organization will enable the implementation of processes to achieve business goals. Standards like ITIL will enable IT to manage the implementation in way proven to achieve results.

Oracle has seen the adoption of ITIL as a key enabler for cloud. IT organizations moving towards cloud computing are utilizing ITIL as the process for delivering cloud services.

ITIL Process	Relation to Cloud Services and Infrastructure
Strategy	
Service Portfolio Catalog	Provide a clear understanding of the cloud services that are being offered.
Financial Management	Provide a financial mechanism to charge for the cloud services.
Demand Management	Provide a means to predict which services will sell, and consequently, provide the necessary infrastructure to support that demand.
Information Security Mgmt	Provide data security and privacy. Allow customers to see only their data.
IT Service Continuity Mgmt	Provide business continuity for cloud customers. This includes but is not limited to backups and recovery procedures for customer's information.
Availability Management	Provide SLA's around availability and recovery. Include high availability options and disaster recovery when defining the service portfolio.
Capacity Management	Provide an elastic infrastructure. Ability to provision and de-provision based on demand and usage.
Transition	
Service Validation and Testing	Provide a means to test and evaluate new or changed services. Allow for pro-active compliance with service contracts.
Change Management	Provide a way to ensure that change is implemented in a controlled manner so as to minimize service disruptions to the many tenants of the shared infrastructure.
Release & Deployment Mgmt	Provide a mechanism which enables clients to effectively utilize the services being built, tested, and deployed in a timely manner.
Service Asset & Configuration Mgmt	Provide a process to manage the cloud offerings and their associated configurations.
Operations	
Access Management	Provide secure and restricted access to authorized infrastructure services by customers.
Event / Incident / Problem Mgmt	Provide hardware, software, systems management lifecycle support services to customer
Request Fulfillment	Provide an automated process for dealing with customer service requests.
Continual Service Improvement	
Service Measurement	Provide a mechanism that enables the monitoring and measurement of services being received to ensure that SLA's are being met and that clients are receiving value from the services they are consuming.
Service Reporting & Audit	Provide a mechanism to prove your results.

Build the Business Case for Cloud

Running IT as a business necessitates establishing business functions in information technology that may not have existed before, or were at best difficult to describe in terms of IT services. IT Businesses will need to move to a model of selling services rather than providing services to their "customers." In the case of a private cloud, these customers are the business units of the company who require IT services. In the case of a public cloud, customers represent the general public looking for some type of IT service to enable their business needs. The creation of business cases centering around financial returns for cloud computing sets the direction for IT organizations looking to operate as a business and achieve the benefits of cloud computing

The business case for cloud starts with the vision the organization has defined and the related goals and objectives required to achieve that vision. An organization with the goal of reducing IT spend over a set number of years may as an example use reduced capital expenditures as a component to the case for pursuing a cloud solution. New organizations primarily concerned with growth may use the rapid provisioning time of a cloud solution as a component to drive the case for a cloud based solution. In the private cloud space, both of these can be achieved through the implementation of standardized software and/or hardware infrastructures.

Organizations entering the public cloud space as a way to generate new sources of revenue or as a way to extend more services to their existing client base will need to consider their level of organizational maturity when determining the costs associated with bringing a public cloud solution to market. As an example, public cloud providers require a high level of process standardization to be successful. If that level of standardization is not in place, then the company will need to invest in building out standard processes and undergo some level of organizational change to affect the use of those standards prior to launching their cloud solution. This will impact time to market for the initiative, as well as the ROI for the offering, at least in the short term.

The amount of time it takes to implement a cloud based solution (public or private) is a critical factor on making the business case. It is important to realize that there are multiple milestones and perhaps different business justifications at various phases. These steps will involve process, system, organizational and other types of change. To ensure ongoing executive support, it should be a key principle to achieve a business benefit at each milestone. Cloud computing is not the end goal for an organization. Providing value in the drive to achieve business objectives is the end goal. Cloud is one way to achieve that goal.

The Oracle Method

Oracle Architecture Development Process (OADP)

Oracle Corporation is the world's largest enterprise software company, offering solutions in every tier of an enterprise's business. These solutions extend into cloud computing. Organizations are looking to Oracle to provide enterprise solution architectures that align with their business strategies and architecture principles, while integrating practically with their current, heterogeneous IT environment.

Oracle created the OADP to provide our customers and partners an approach that was built upon the several decades of knowledge Oracle has acquired from working on these challenges of implementing enterprise IT solutions at virtually every corner of every major industry that needs such technology. Oracle has applied this methodology with great success at numerous customers to build both private and public clouds.
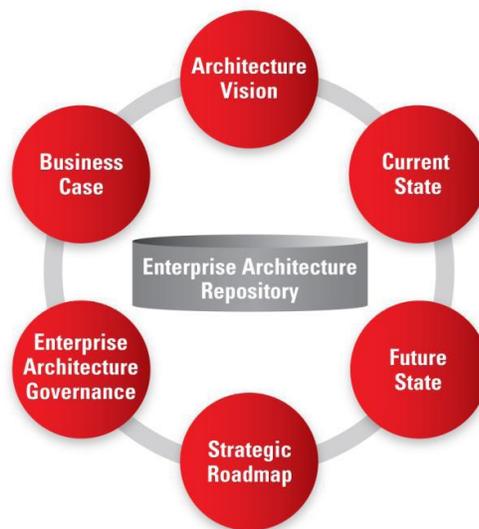
Oracle Architecture Development Process

Oracle Enterprise Architecture Framework (OEAF)

The path outlined above has been derived from leading architecture frameworks and Oracle's experience in building public and private clouds for its customers. To make sure that your cloud strategy accomplishes its intended purpose, it is important for the enterprise architect to use a framework for the design and maintenance of any new enterprise architecture. The application of an Enterprise Architecture Framework will lead the architect through the process, from the statement of the architectural vision and the analysis of the business architecture, through the systems and technical architecture designs, to incorporating deployment considerations of migration planning, governance, and change management.

Oracle's Enterprise Architecture Framework can be used to streamline the architectural process for designing a public, private, or hybrid cloud infrastructure. Oracle's framework is aligned with other industry EA frameworks but adds Oracle-specific EA artifacts, such as Oracle reference architectures, tools, and prescriptive guidance for best practice implementation and governance.
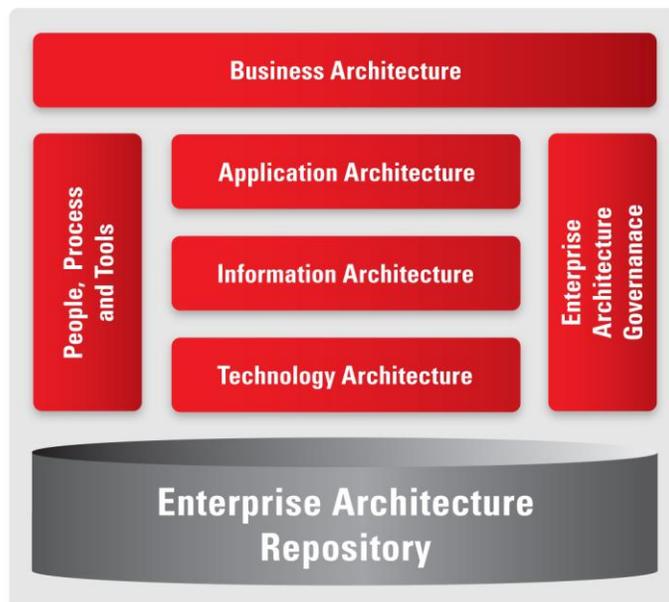
Oracle Enterprise Architecture Framework

.Additional Resources

[Oracle Cloud Computing](#)

[Platform-as-A-Service Private Cloud with Oracle Fusion Middleware](#)

[Oracle Platform for SaaS: Building On Demand Applications](#)

[Bridging the Divide between SaaS and Enterprise Datacenters](#)

[Architectural Strategies for Cloud Computing](#)

ORACLE®

Oracle White Paper in Enterprise Architecture—
Achieving the Cloud Computing Vision

October 2010

Author: Michael Glas, Paul Andres

Oracle Corporation
World Headquarters
500 Oracle Parkway
Redwood Shores, CA 94065
U.S.A.

Worldwide Inquiries:
Phone: +1.650.506.7000
Fax: +1.650.506.7200
www.oracle.com

Oracle is committed to developing practices and products that help protect the environment

ORACLE®